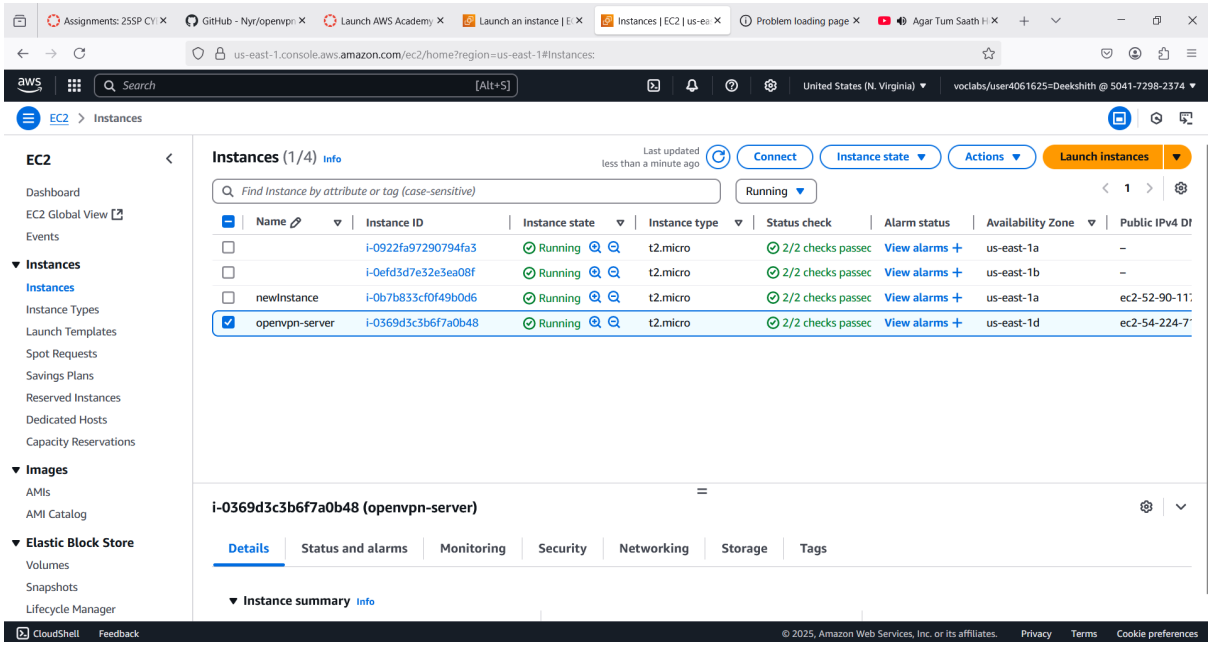
Lab-3 Hosting a OpenVPN Server

Final Assignment Option-C

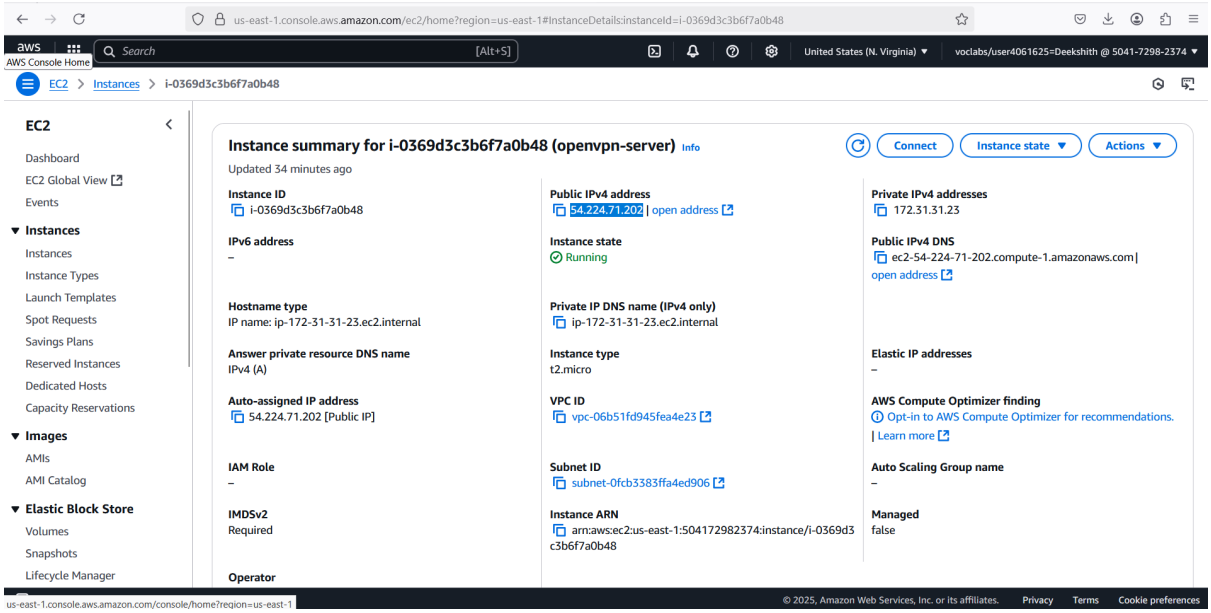
CYBR-8410 Distributed System Security

Name: Deekshith Rao Rangineni



- **Cloud Provider and Instance Specifications**

- **Cloud Provider:** AWS EC2
- **Instance Type:** t2.micro
- **Operating System:** Ubuntu 20.04 LTS (64-bit)
- **Public IP:** 54.224.71.202
- **Security Group Rules:**
  - SSH (TCP port 22): Enabled for my IP
  - OpenVPN (UDP port 1194): Enabled for all IPs (0.0.0.0/0)



This my Instance Summary For the openvpn-server

```
PS C:\Users\deeks\Downloads> ssh -i '.\labsuser.pem' ubuntu@54.224.71.202
The authenticity of host '54.224.71.202 (54.224.71.202)' can't be established.
ED25519 key fingerprint is SHA256:7JDC0tT/tI6NrfEFI/4Umzs+sYPvmNe7Vv5JEWSiiJw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.224.71.202' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1024-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Wed May  7 23:17:19 UTC 2025

  System load:  0.02              Processes:             106
  Usage of /:   21.8% of 7.57GB   Users logged in:       0
  Memory usage: 20%               IPv4 address for eth0: 172.31.31.23
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

Connected to EC2 via SSH using the key file from my PC

```
The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

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applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-31-23:~$
```

Successfully connected to the UBuntu

```
ubuntu@ip-172-31-31-23:~$ wget https://git.io/vpn -O openvpn-install.sh
--2025-05-07 23:18:17--  https://git.io/vpn
Resolving git.io (git.io)... 140.82.114.21
Connecting to git.io (git.io)|140.82.114.21|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.github.com/Nyr/openvpn-install/master/openvpn-install.sh [following]
--2025-05-07 23:18:17--  https://raw.github.com/Nyr/openvpn-install/master/openvpn-install.sh
Resolving raw.github.com (raw.github.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.github.com (raw.github.com)|185.199.109.133|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh [following]
--2025-05-07 23:18:17--  https://raw.githubusercontent.com/Nyr/openvpn-install/master/openvpn-install.sh
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.109.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 24807 (24K) [text/plain]
Saving to: ‘openvpn-install.sh’

openvpn-install.sh                  100%[=============================================================================>]  24.23K  --.-KB/s    in 0s

2025-05-07 23:18:17 (138 MB/s) - ‘openvpn-install.sh’ saved [24807/24807]
```

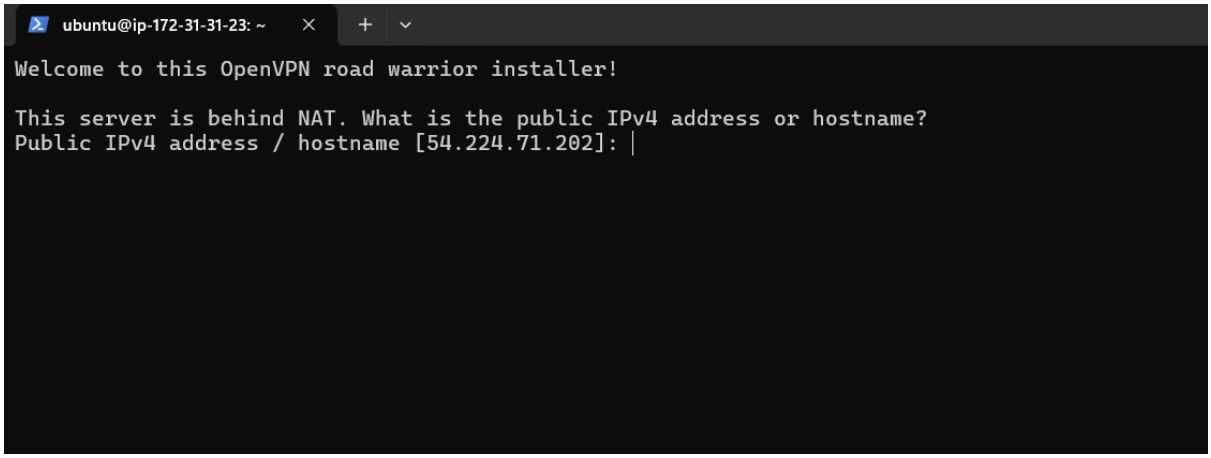
Downloaded the OpenVPN install script using:

wget https://git.io/vpn -O openvpn-install.sh

Ran the script to install OpenVPN and set it up.

chmod +x openvpn-install.sh

sudo ./openvpn-install.sh



The script detected that the server is behind a NAT and asked for the public IP address clients will connect to. It auto-filled the correct public IP (54.224.71.202), so I just pressed Enter to continue.

```
Welcome to this OpenVPN road warrior installer!

This server is behind NAT. What is the public IPv4 address or hostname?
Public IPv4 address / hostname [54.224.71.202]:

Which protocol should OpenVPN use?
   1) UDP (recommended)
   2) TCP
Protocol [1]:

What port should OpenVPN listen on?
Port [1194]:

Select a DNS server for the clients:
   1) Default system resolvers
   2) Google
   3) 1.1.1.1
   4) OpenDNS
   5) Quad9
   6) AdGuard
   7) Specify custom resolvers
DNS server [1]: 2

Enter a name for the first client:
Name [client]: deekshith
```

Selected configuration options:

- Protocol: UDP
- DNS: Google
- Client name: deekshith

```
OpenVPN installation is ready to begin.
Press any key to continue...
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2311 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2556 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [415 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [18.5 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [3485 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [620 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [676 B]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1202 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [297 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [28.7 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [46.5 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.8 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [592 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [68.8 kB]
```

Downloaded and executed OpenVPN install Script

```
Check that the request matches the signature
Signature ok
The Subject's Distinguished Name is as follows
commonName            :ASN.1 12:'deekshith'
Certificate is to be certified until May  5 23:21:58 2035 GMT (3650 days)

Write out database with 1 new entries
Data Base Updated

Notice
------
Inline file created:
* /etc/openvpn/server/easy-rsa/pki/inline/private/deekshith.inline


Notice
------
Certificate created at:
* /etc/openvpn/server/easy-rsa/pki/issued/deekshith.crt

Using configuration from /etc/openvpn/server/easy-rsa/openssl-easyrsa.cnf

Notice
------
An updated CRL DER copy has been created:
* /etc/openvpn/server/easy-rsa/pki/crl.der

An updated CRL has been created:
* /etc/openvpn/server/easy-rsa/pki/crl.pem

IMPORTANT: When the CRL expires, an OpenVPN Server which uses a
CRL will reject ALL new connections, until the CRL is replaced.

Created symlink /etc/systemd/system/multi-user.target.wants/openvpn-iptables.service → /etc/systemd/system/openvpn-iptables.service.
Created symlink /etc/systemd/system/multi-user.target.wants/openvpn-server@server.service → /lib/systemd/system/openvpn-server@.service.

Finished!

The client configuration is available in: /home/ubuntu/deekshith.ovpn
New clients can be added by running this script again.
```

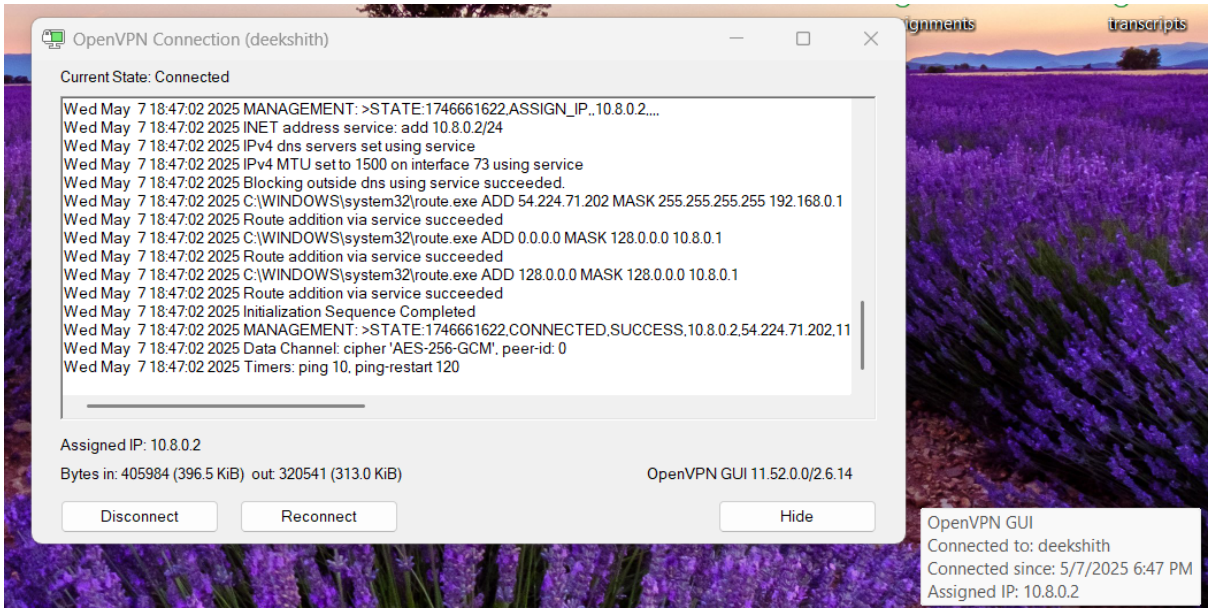
The VPN setup script successfully created the certificate and client configuration file for deekshith. It saved the final .ovpn file in /home/ubuntu, ready to be used for connecting to the VPN.

```
ubuntu@ip-172-31-31-23:~$ sudo find / -name "*.ovpn"
/home/ubuntu/deekshith.ovpn
ubuntu@ip-172-31-31-23:~$ exit
logout
Connection to 54.224.71.202 closed.
PS C:\Users\deeks\Downloads> scp -i .\labsuser.pem ubuntu@54.224.71.202:/home/ubuntu/deekshith.ovpn .
deekshith.ovpn                                                                100% 4980    48.6KB/s   00:00
PS C:\Users\deeks\Downloads>
```

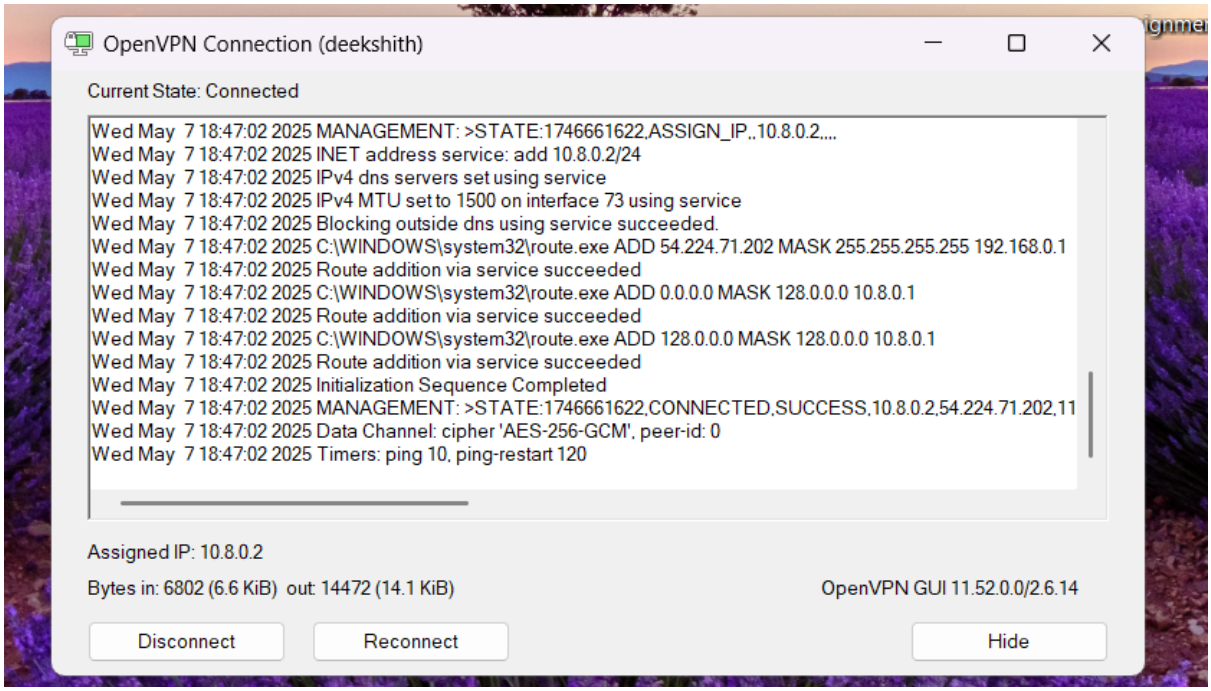
The script generated a file called deekshith.ovpn, which I securely copied to my computer using:

scp -i labsuser.pem ubuntu@54.224.71.202:/home/ubuntu/deekshith.ovpn .

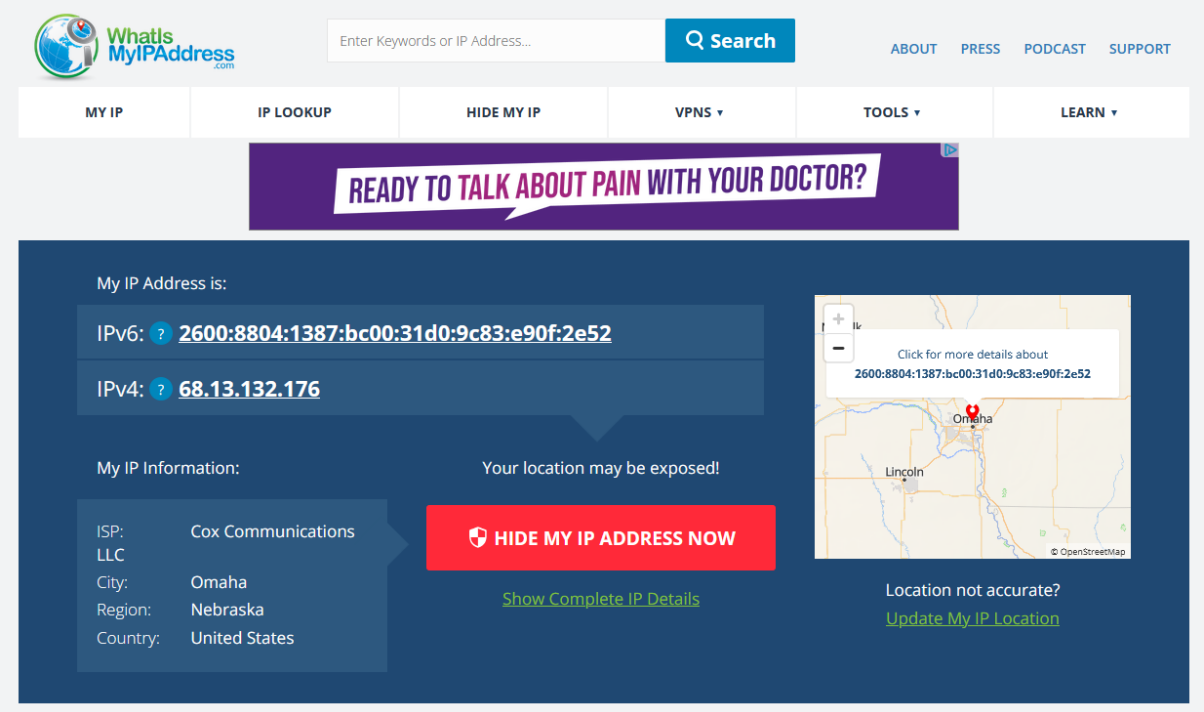
Now installed the OpenVPN GUI and Run It as a Administrator



So after running it I saw at the bottom vpn was installed then I connected it ti the deekshith open vpn file successfully as you can see in the screenshot

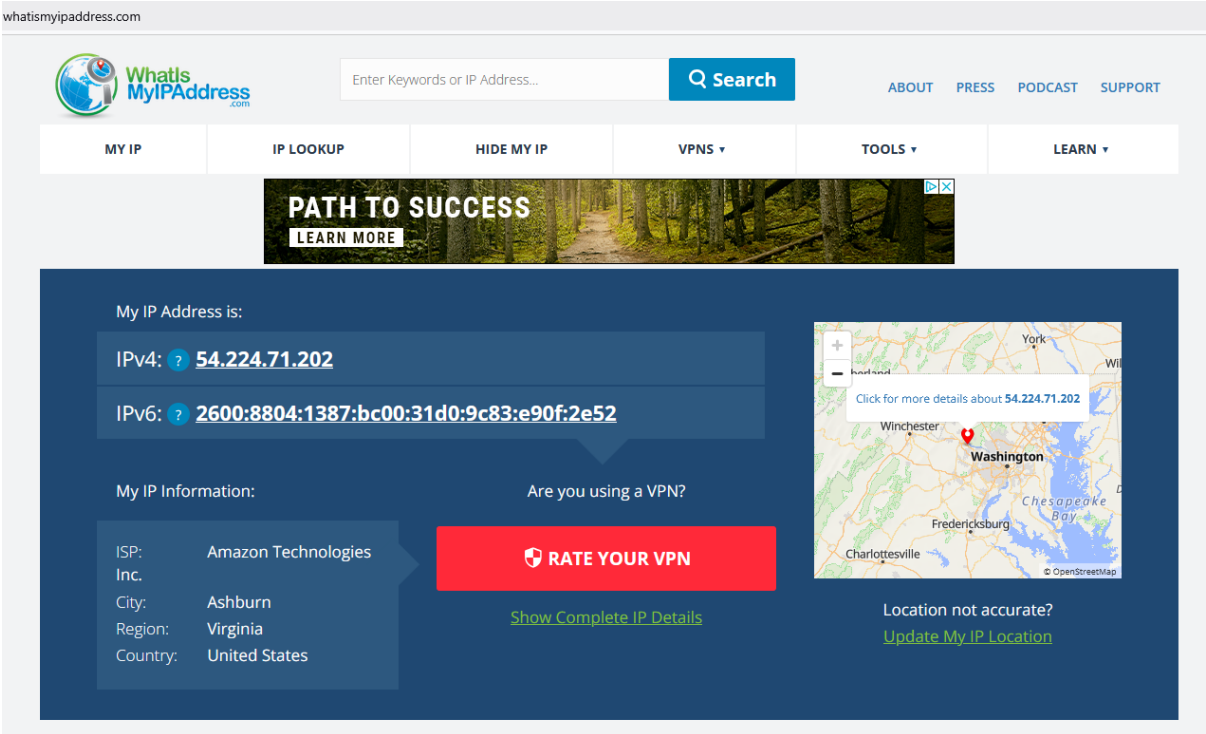


Here is the other screenshot of the VPN connected successfully.

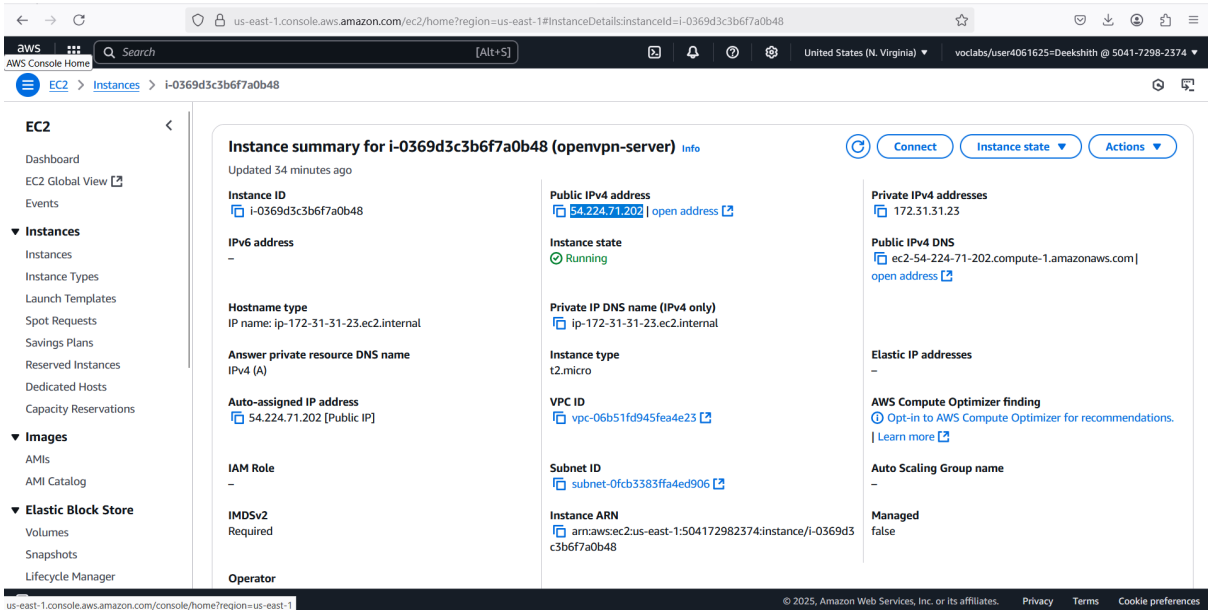


To test whether the VPN was working, I used the website whatismyipaddress.com to check my IP address before and after connecting

This was before connecting to the VPN my regular home IP address Showed Up



After connecting to VPN It showed the AWS server's public IP: 54.224.71.202



So, my public IP address Was shown in The Website As you can see it in My Instance Summary this proves that all my traffic was being routed through the VPN tunnel. I also conformed connection through the OpenVPN GUI window, which displayed

Conclusion:

The OpenVPN setup on AWS was successful. I was able to install and configure the VPN server, generate a client profile, connect from my windows computer, and verify encrypted traffic by confirming my IP address changed. This hands-on project helped me understand secure communication and tunnelling in distributed systems.